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Electric Vehicle Owners

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Enhancing Equity in the Plug-In Electric Vehicle Transition: Lessons from Rural California Electric Vehicle Owners

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Issue

In California, 38% of greenhouse gas (GHG) emissions come from the transport sector, and 27% of these transport emissions come from passenger vehicles. To reach carbon neutrality by 2045, as directed under Executive Order B 55 18, electrification of passenger vehicles is required. To facilitate an equitable transition to electric vehicle technologies, policymakers must account for the diverse needs and challenges faced by residents in rural communities. Rural areas often have greater travel distances and a reliance on passenger vehicles, due to a lack of alternative modes. While rural areas account for only 7% of the state's population, California policy decisions can be far reaching and serve as guidance for other states with higher rural populations.

To better understand the unique barriers and opportunities for rural electric vehicle adoption, we conducted in-depth interviews with 35 rural owners of plug-in electric vehicles (PEVs) across six counties in California. A PEV is an electric vehicle with a plug: either a battery electric vehicle (BEV) or a plug-in hybrid electric vehicle (PHEV). The study explored the owners' travel behaviors, charging experiences, and motivations for PEV purchase. By centering on the experiences of current rural PEV users, the research offers insights into how infrastructure development, policy incentives, and outreach strategies can be better tailored to support equitable PEV adoption in rural communities.

Key Research Findings

Rural PEV owners often face significant charging barriers.

Challenges such as sparse public charging infrastructure and limited at-home charging options, especially for those without garages or with outdated electrical infrastructure, were recurring concerns. These challenges were more significant for owners of BEVs than for owners of PHEVs.

Public charging is essential, but rural access remains inadequate.

Rural BEV owners depend heavily on public charging for longer trips. Yet, they frequently reported insufficient or unreliable charging options, especially Level 3 (fast) chargers. Long detours, broken chargers, or limited availability were commonly cited problems. Many PEV owners discussed the need to plan trip routes ahead of time to minimize public charging challenges. Many said that increasing fast charger availability in rural towns and along common travel corridors would significantly improve their experience.

High reliance on at-home chargers.

Most rural PEV owners charged at home most of the time, citing convenience and cost savings as the main motivation for this. However, some households could not accommodate home charging due to lack of garages, outdated wiring, or renter status. In some cases, owners had to install expensive electrical upgrades or rely on slow Level 1 (standard outlet) charging. Targeted incentives and technical assistance for home charging installations in rural areas could help overcome these barriers.

Plug-in hybrids offer a practical entry point in rural settings. PHEVs were often seen as a more flexible and less stressful choice for rural residents, offering the benefits of electrification without full reliance on a sparse charging network. Many PHEV owners expressed interest in switching to BEVs in the future if charging infrastructure improves. Supporting PHEV adoption can serve as a stepping stone toward full electrification in rural areas. For households with two or more vehicles, promoting a PHEV and BEV mix may also be a viable solution.

Outreach and incentive programs must better reach rural communities. Interviewees often learned about PEVs through word of mouth or independent research, not through state programs or dealerships. While interviewees were aware of incentive programs available for PEVs, further outreach through trusted local institutions could help expand PEV adoption in rural regions.

More Information

This policy brief is drawn from the report “Cars and Chargers in the Countryside: Rural PEV Owner Accounts of Charging and Travel in California” prepared by Anya R. Robinson and Scott Hardman with the University of California, Davis. The report can be found at https://ucits.org/research_products/research-report-cars-and-chargers-in-the-country-rural-pev-owner-accounts-of-charging-and-travel-in-california/. For more information about findings presented in this brief, please contact Scott Hardman at shardman@ucdavis.edu.

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